

May 25, 2000

TO: Alex Stone, Transition Project Manager  
Nuclear Waste Program

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**EDMC**

SUBJECT: 300-FF-2 Operable Unit (OU) Uranium Groundwater Contamination

**Conclusions**

**Soil**

1. Uranium groundwater contamination is likely occurring from sources other than 300-FF-1 OU. Specifically, it is concluded that the source sites are located outside of the uranium groundwater plume, as defined in the 300-FF-5 OU documentation. Uranium groundwater contamination that has been previously documented is described below as background information.

**Groundwater**

2. Uranium concentrations in the groundwater have not attenuated as predicted (i.e., levels are observed to increase). The predicted attenuation is described below as background information.
3. Uranium groundwater contamination is not currently linked to source sites. In addition, insufficient source monitoring is occurring to allow groundwater contamination source determinations.
4. Uranium contamination has been migrating in the groundwater as observed from wells located along the river's edge. Furthermore, the concentration of this uranium contamination has been increasing for the last decade.

**Data Evaluation/Other**

5. The evaluation of groundwater contamination has not allowed groundwater impacts from the 300-FF-2 OU source sites to the Columbia River to be understood (i.e., impacts to groundwater quality, impacts to drinking water sources, impacts to ecological receptors, etc.).
6. An evaluation of the available uranium groundwater contamination data in relation to the 300-FF-5 OU, after issuance of the interim ROD and in relation to potential 300-FF-2 OU source sites, does not appear to have been performed. As such, potential impacts have not been evaluated inclusively in the decision process associated with the 300-FF-2 OU.

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**Hanford Environmental Information System (HEIS) Uranium Data Review**

I have conducted a review of uranium groundwater data currently available in the HEIS database associated with the 300-FF-5 OU. Trend plots of uranium concentrations (pCi/L) versus sampling dates were developed for the following groundwater monitoring wells: 399-2-3, 399-2-2, 399-1-5, 399-1-4, 399-3-10, 399-2-1, 399-1-2, 399-3-3, 399-3-2, and 399-3-6. A copy of all trend plots developed is attached.

The following observations were made from review of the information:

- Uranium concentrations have not decreased as predicted. See plots from wells 399-2-3, 399-2-2, 399-1-5, 399-1-4, 399-3-10, 399-2-1, 399-1-2, 399-3-3, 399-3-2, and 399-3-6.
- Wells 399-2-2, 399-2-3, 399-3-1, 399-3-9 and 399-3-10 are located north to south along the river shoreline. The trend plots show gradual increasing uranium concentrations in all these wells. The increasing trend is seen beginning around the year 1990 and has been increasing since. The maximum concentration of uranium in the north most well 399-2-2 is about 350 pCi/L and the southern well 399-3-10 is about 90 pCi/L. All these wells fall within the 300-FF-5 uranium plume. All these wells are very close to the river and it can be easily concluded that the contaminant has been polluting the river for many years.
- Wells 399-3-6, 399-3-2 and 399-3-3 are located on the southern part of 300-FF-1 area and are outside the boundary of the uranium plume. There is no specific trend of the uranium concentrations on these wells. However, the concentrations of uranium have been periodically up to approximately 40 pCi/L. Some external source seems to be impacting the uranium concentrations of these wells.
- Wells 399-1-2, 399-1-4 and 399-1-5 have also been plotted for uranium trends. These wells are located within uranium plume and are on the western edged of 300-FF-1 operable unit. Well 399-1-5 shows a definite increasing trend of uranium since about 1992, the maximum concentration being about 180 pCi/L. The other two wells, 399-1-2 and 399-1-4, indicate concentrations in the range of 20 to 50 pCi/L since the beginning of observations. The impact on these wells could be from the source sites in the vicinity of the wells.

**Background**

**"Limited Field Investigation Report for the 300-FF-2 Operable Unit", Rev. 0**

The "Limited Field Investigation Report for the 300-FF-2 Operable Unit", (DOE/RL-96-42, Rev. 0) describes the groundwater contamination associated with 300-FF-2 OU source sites and states:

[A] plume of groundwater contamination is also present throughout the 300 Area as a result of historical 300 Area activities (DOE-RL 1994a). The plume is centered beneath the 300-FF-1 Operable Unit and includes TCE, 1,2-dichloroethylene (1,2-DCE), and uranium isotopes. Maximum concentrations of the contaminants occur primarily in the vicinity of the 316-5 Process Trenches and the North and South Process Ponds (316-1

300-FF-2 Operable Unit (OU) Uranium Groundwater Contamination and 316-2). While 300-FF-2 sources may also be contributing to the 300-FF-5 groundwater contamination, based on current RI/FS data collected from the 300-FF-5 Operable Unit investigation, there are no known 300-FF-2 sources impacting the 300-FF-5 groundwater.

**"Proposed Plan for the 300-FF-2 Operable Unit" (DOE/RL-99-53, Draft A)**

The "Proposed Plan for the 300-FF-2 Operable Unit" (DOE/RL-99-53, Draft A, November 1999) describes the groundwater contamination associated with 300-FF-2 OU source sites and states: "[T]he 316-4 Crib is the only 300-FF-2 OU waste site that has been shown to impact groundwater. Groundwater monitoring results suggest that the remaining uranium contamination is localized and still bound within the soil underlying the crib." The groundwater contamination is further described by the following:

Uranium contamination in groundwater beneath the 316-4 Crib was first detected in 1951. Local area groundwater wells, surface contours, and flow directions are depicted in Figure 5. Concentrations of uranium detected in groundwater from well 699-S6-E4A ranged between 22 and 165 µg/L from 1996 to 1999. Based on monitoring information and estimates of travel times from well 699-S6-E4A to the nearest downgradient wells and the Columbia River (43 days and 7.3 years, respectively), the contamination appears to be localized at the 316-4 Crib and is not migrating into other areas.

The "Proposed Plan for the 300-FF-2 Operable Unit" (DOE/RL-99-53, Draft A, November 1999) states:

This Proposed Plan presents remedial action alternatives for the 7 general content burial grounds, 47 source sites, and 20 candidate sites included in the 300-FF-2 OU. It also addressed contaminated groundwater beneath the 316-4 Crib. The 300-FF-2 source OU is the third and final OU associated with cleanup of the 300 Area NPL site. Remediation of the 300-FF-1 and 300-FF-5 OUs is underway in accordance with an associated ROD. The remedial actions presented in this Proposed Plan address contaminated soil and groundwater associated with the 300-FF-2 OU and are consistent with the ongoing cleanup actions in the 300 Area.

**"EPA National Remedy Review Board Briefing Package 300-FF-2 Operable Unit"**

The "EPA National Remedy Review Board Briefing Package 300-FF-2 Operable Unit" (December 6, 1999), states: "The 300-FF-2 OU also includes one area of existing groundwater contamination that was not addressed as part of the ROD for the 300-FF-5 OU." In a description of the 300-FF-5 Groundwater OU, it is stated: "[B]ased on results from groundwater monitoring, no 300-FF-2 OU sources appeared to be impacting 300-

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FF-5 OU groundwater at that time." The same document describes the 300-FF-2 OU by: "[I]t also addresses existing groundwater contamination beneath the 316-4 Crib."

**"Proposed Plan for the 300-FF-2 Operable Unit" (DOE/RL-99-53, Draft B)**

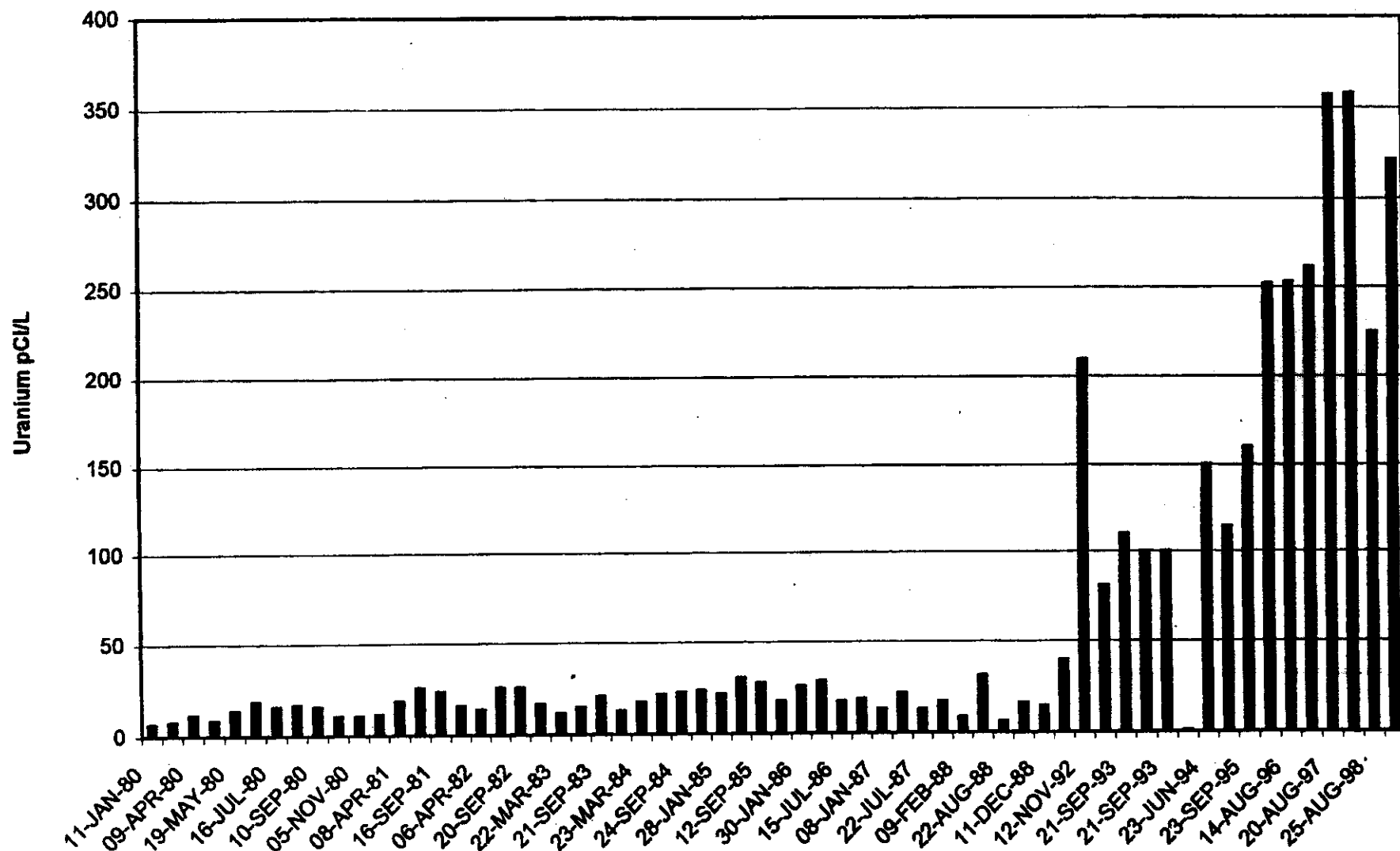
The "Proposed Plan for the 300-FF-2 Operable Unit" (DOE/RL-99-53, Draft B, April 2000) describes the 300-FF-5 Groundwater Operable Unit and the basis of the 300-FF-5 OU ROD. Specifically, the following conclusions are identified:

- Uranium was the primary contaminant of concern in 300 area groundwater
- 300-FF-1 OU liquid disposal sites were a primary source of the groundwater contamination
- elevated uranium concentrations in groundwater were estimated to dissipate in 3 – 10 years as a result of removal of source materials and natural attenuation.

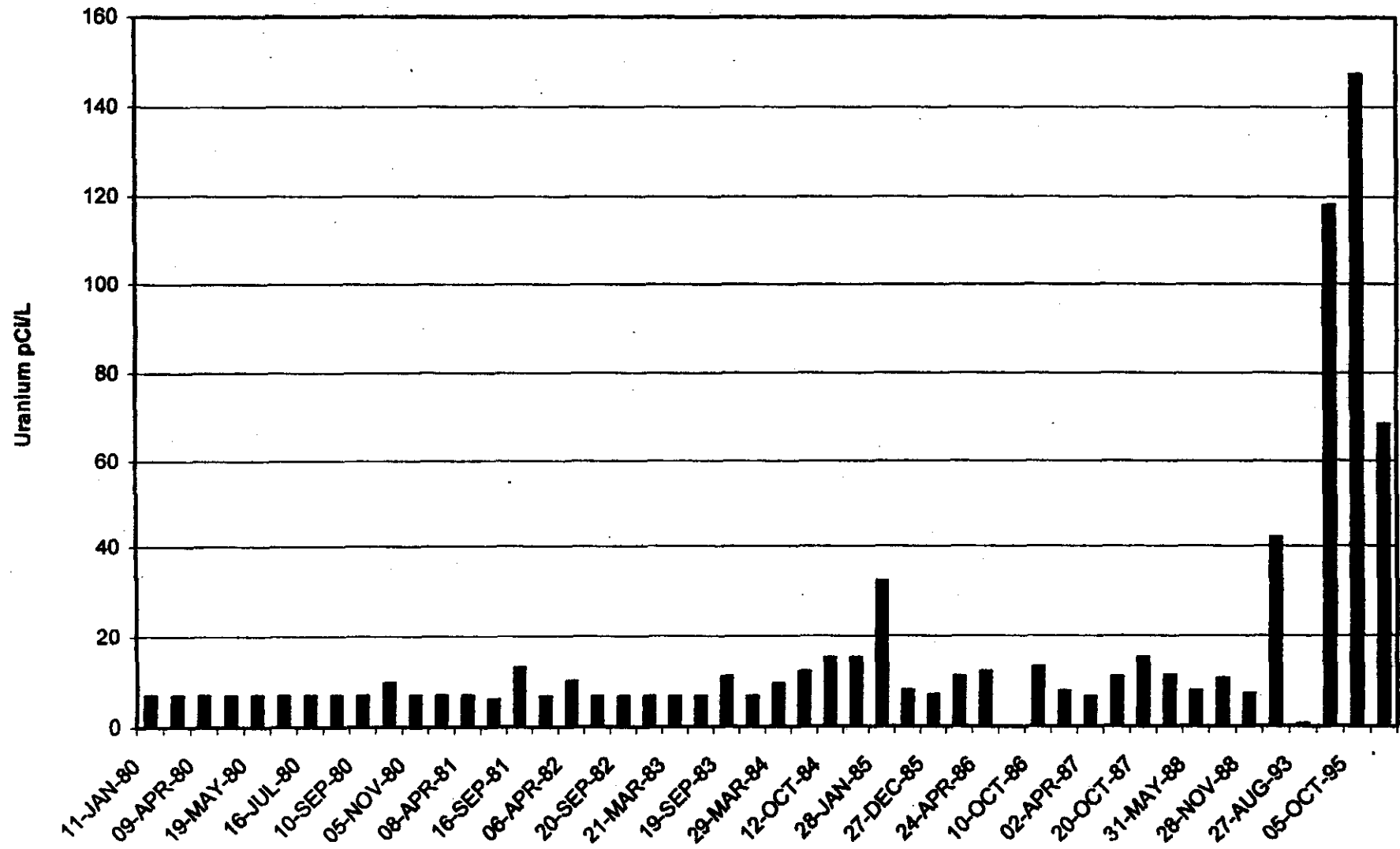
The "Proposed Plan for the 300-FF-2 Operable Unit" (DOE/RL-99-53, Draft B) defers all groundwater contamination issues to the 300-FF-5 OU by the following: "Any contaminated groundwater that is attributed to the 300-FF-2 OU waste sites will be addressed as part of the 300-FF-5 OU."

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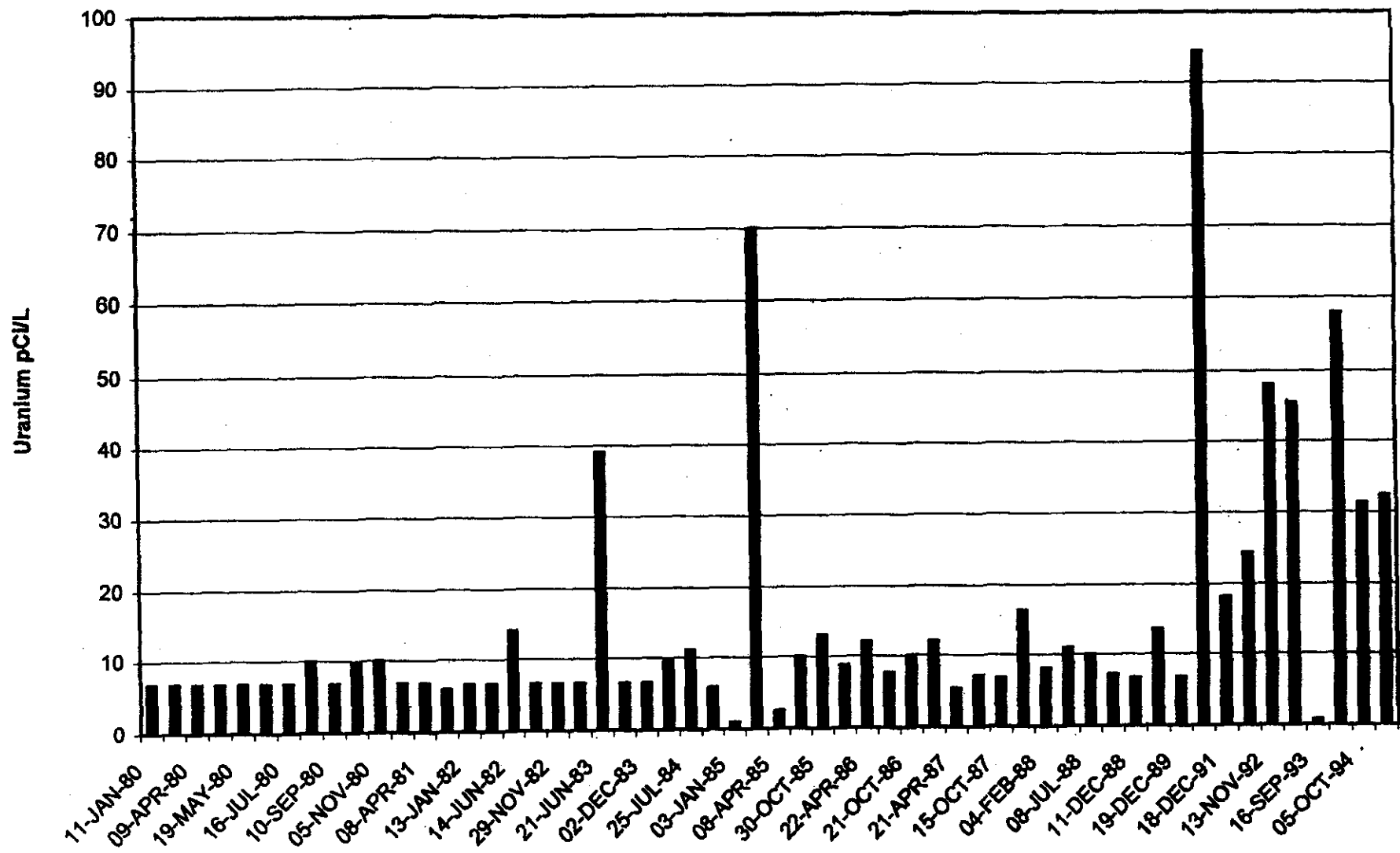
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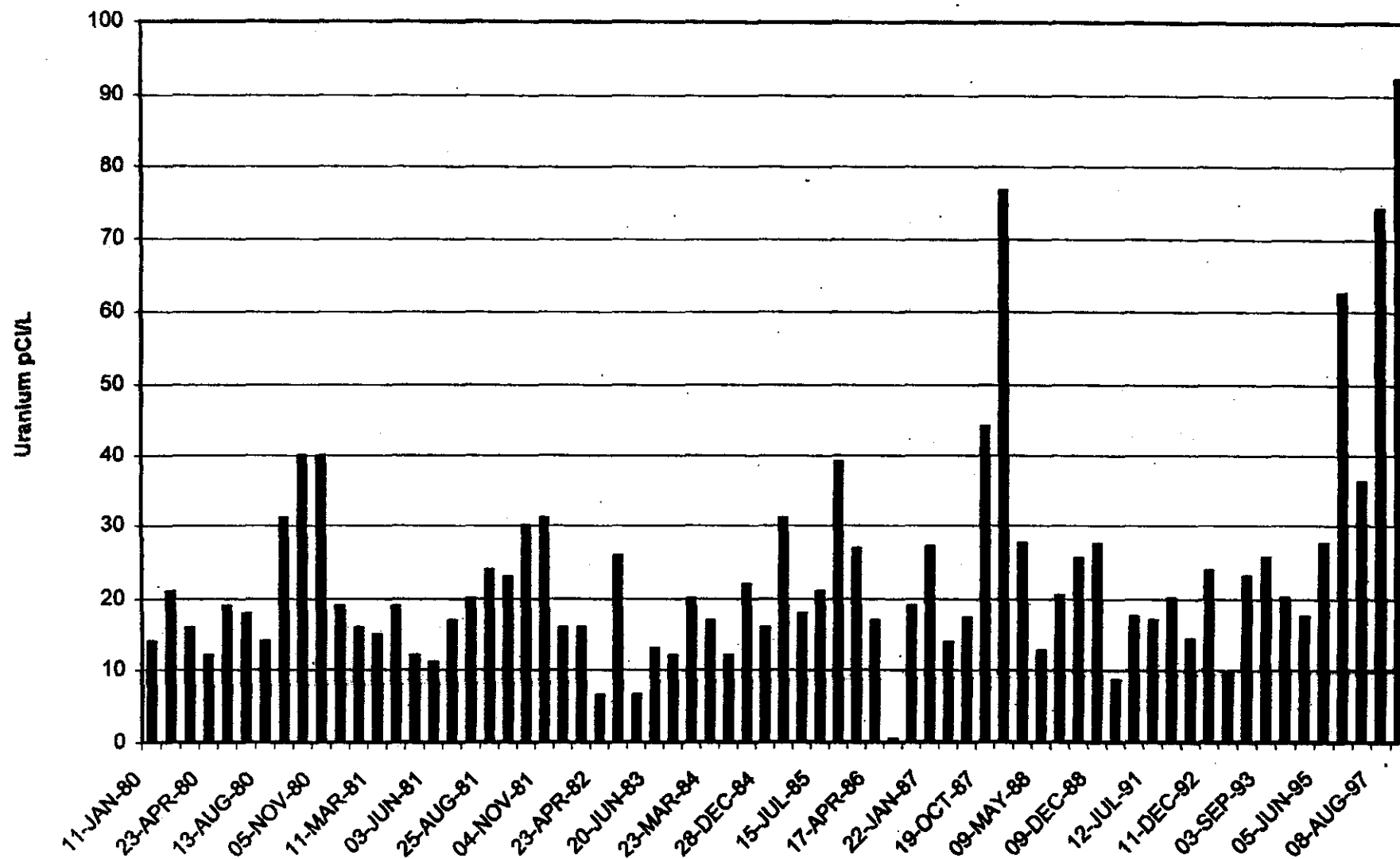
Well 399-2-3



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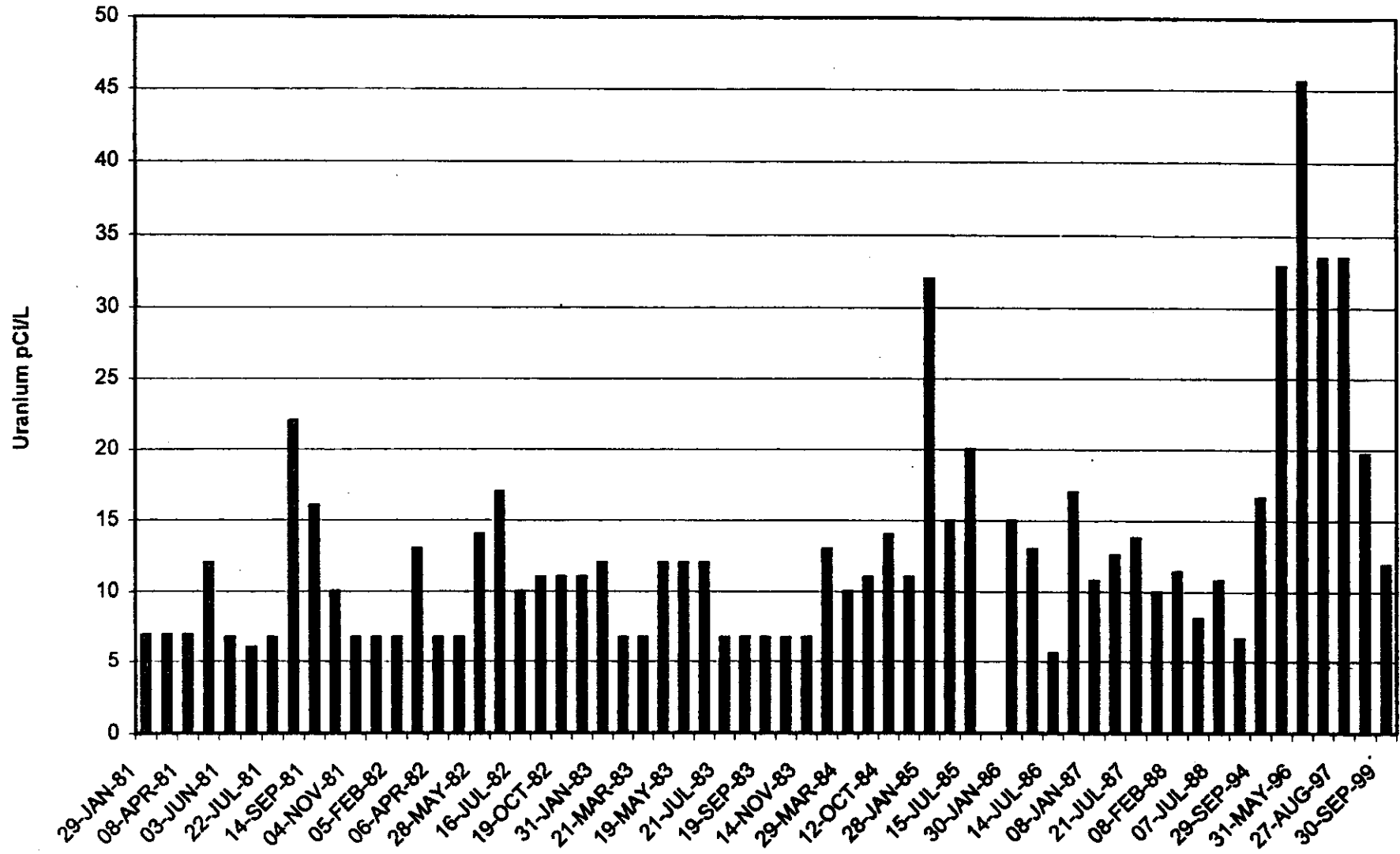


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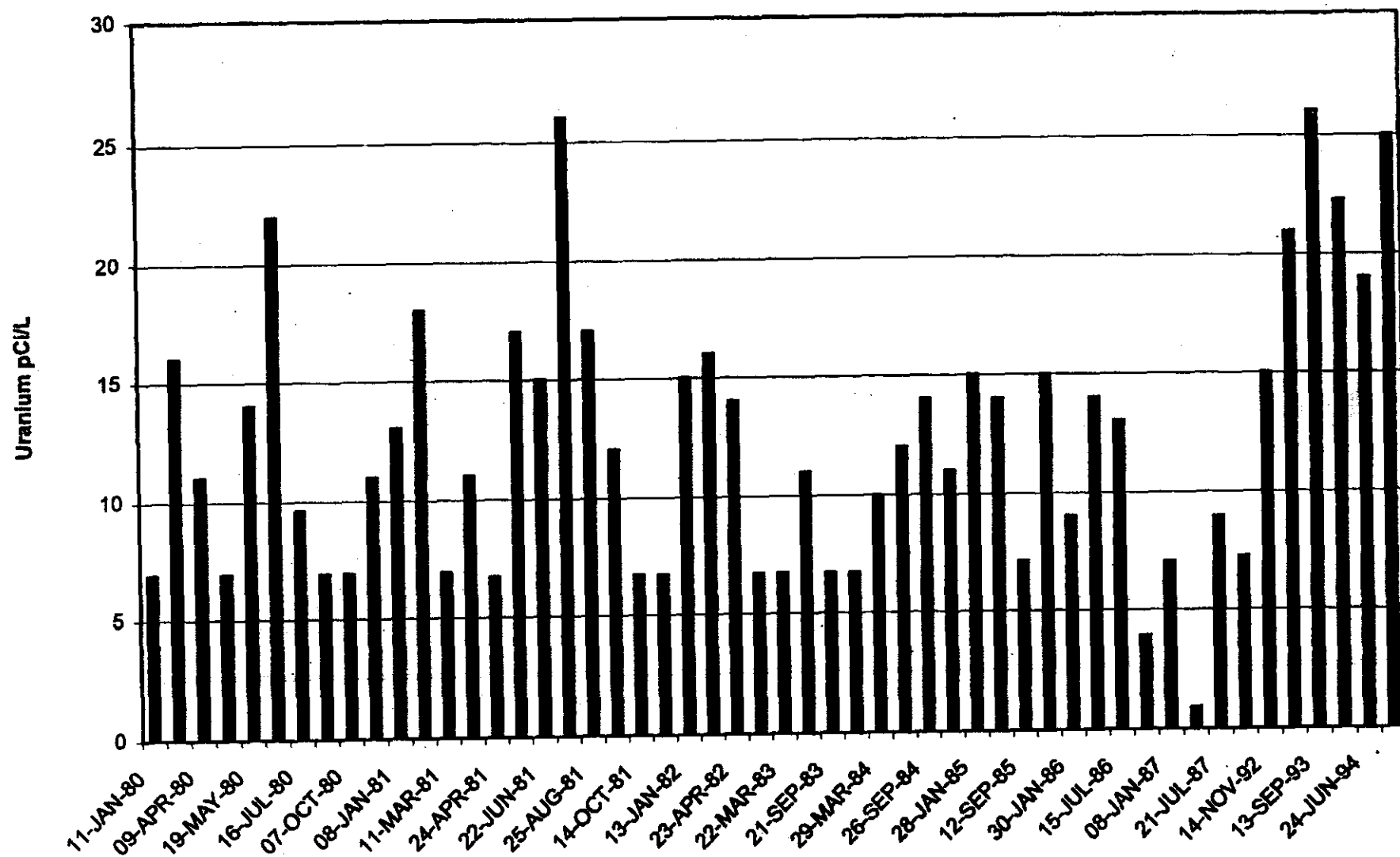




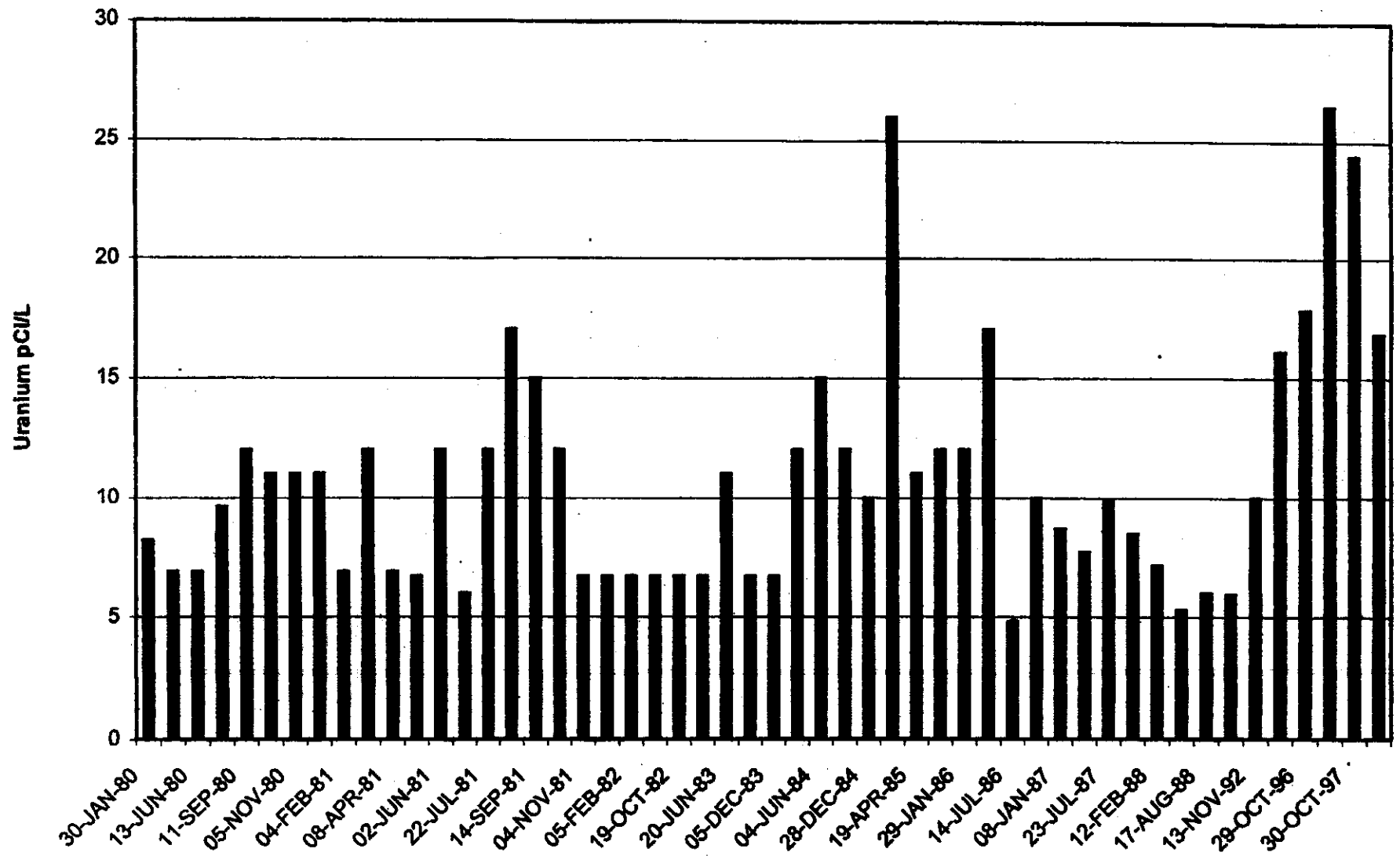
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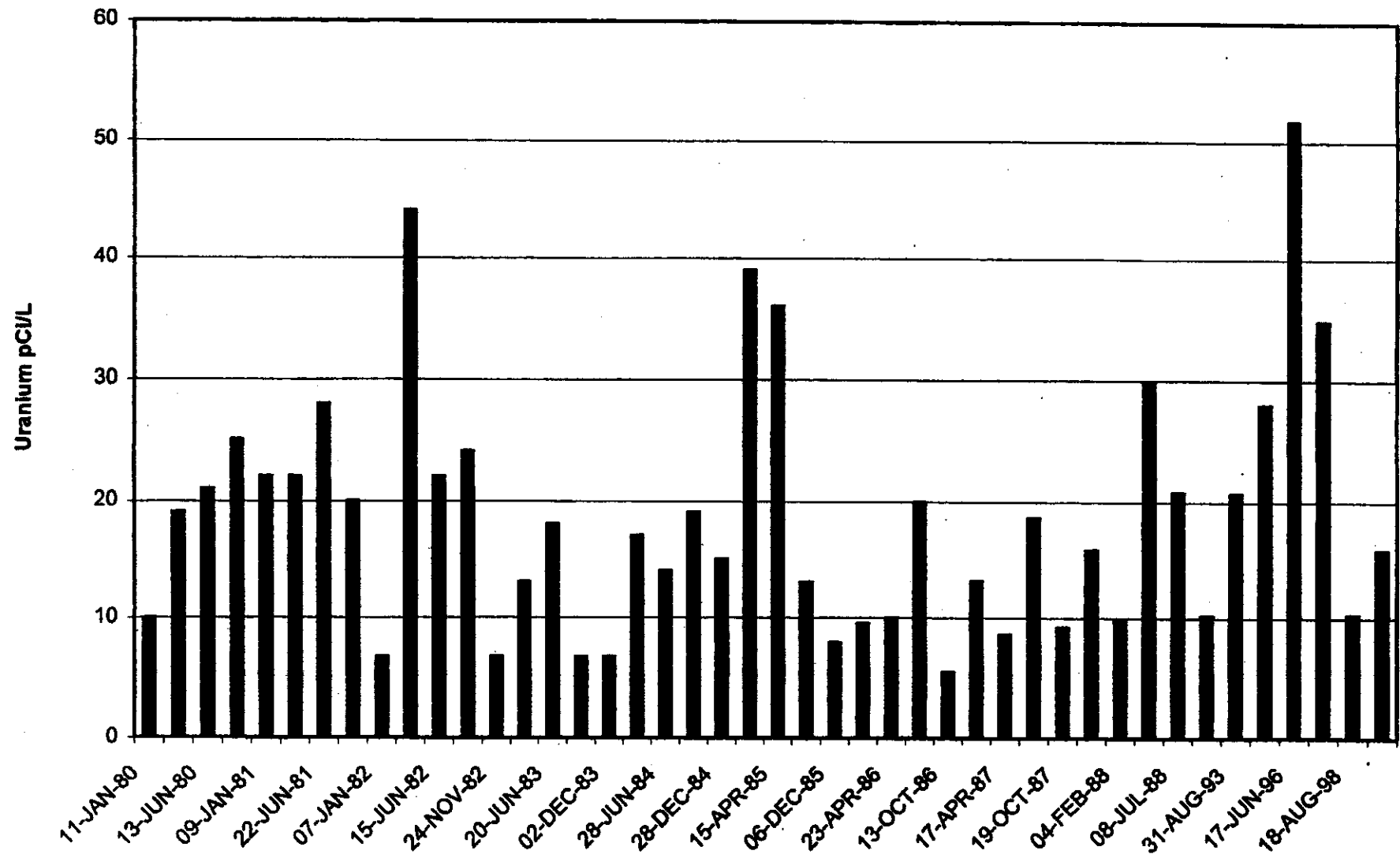
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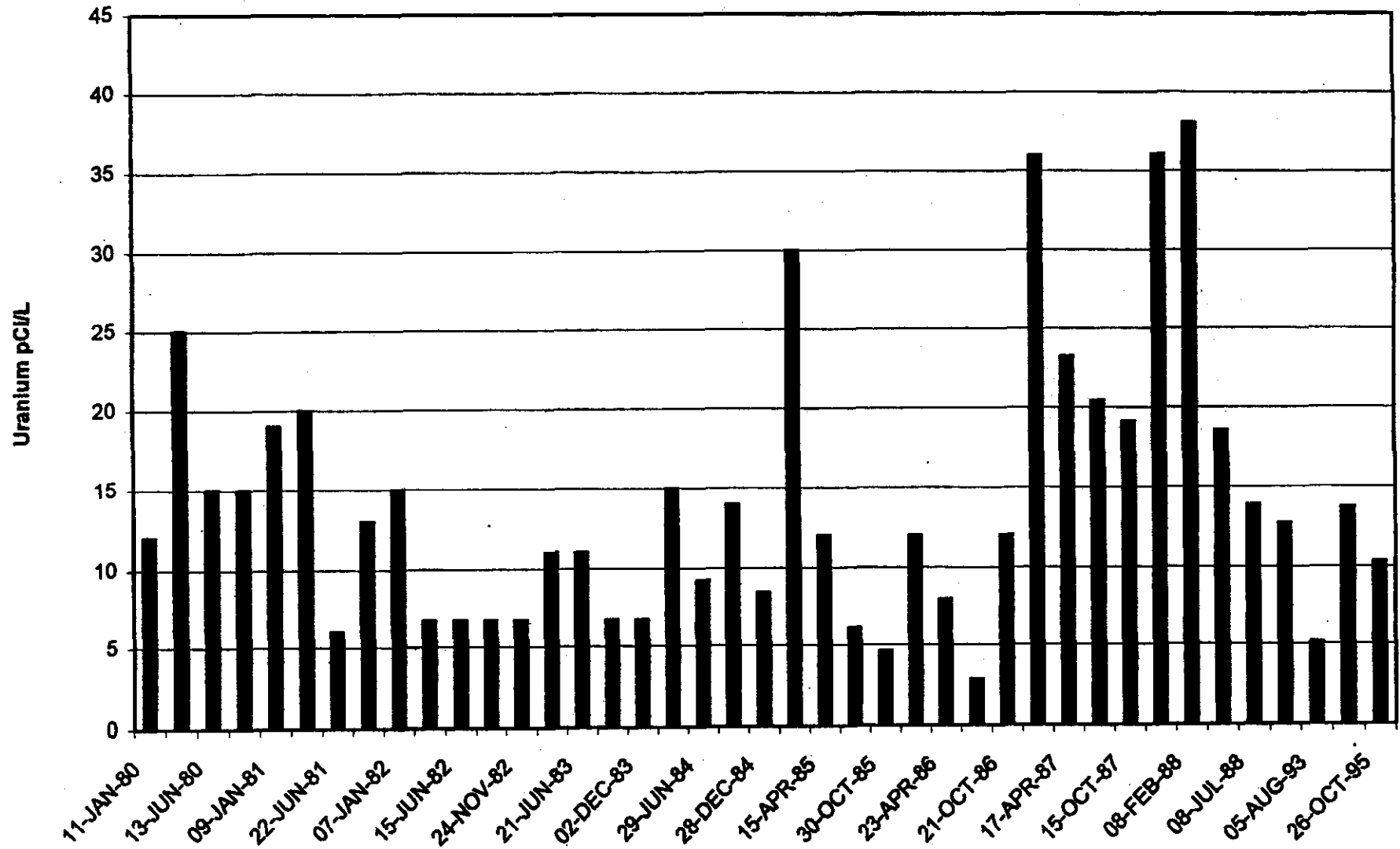
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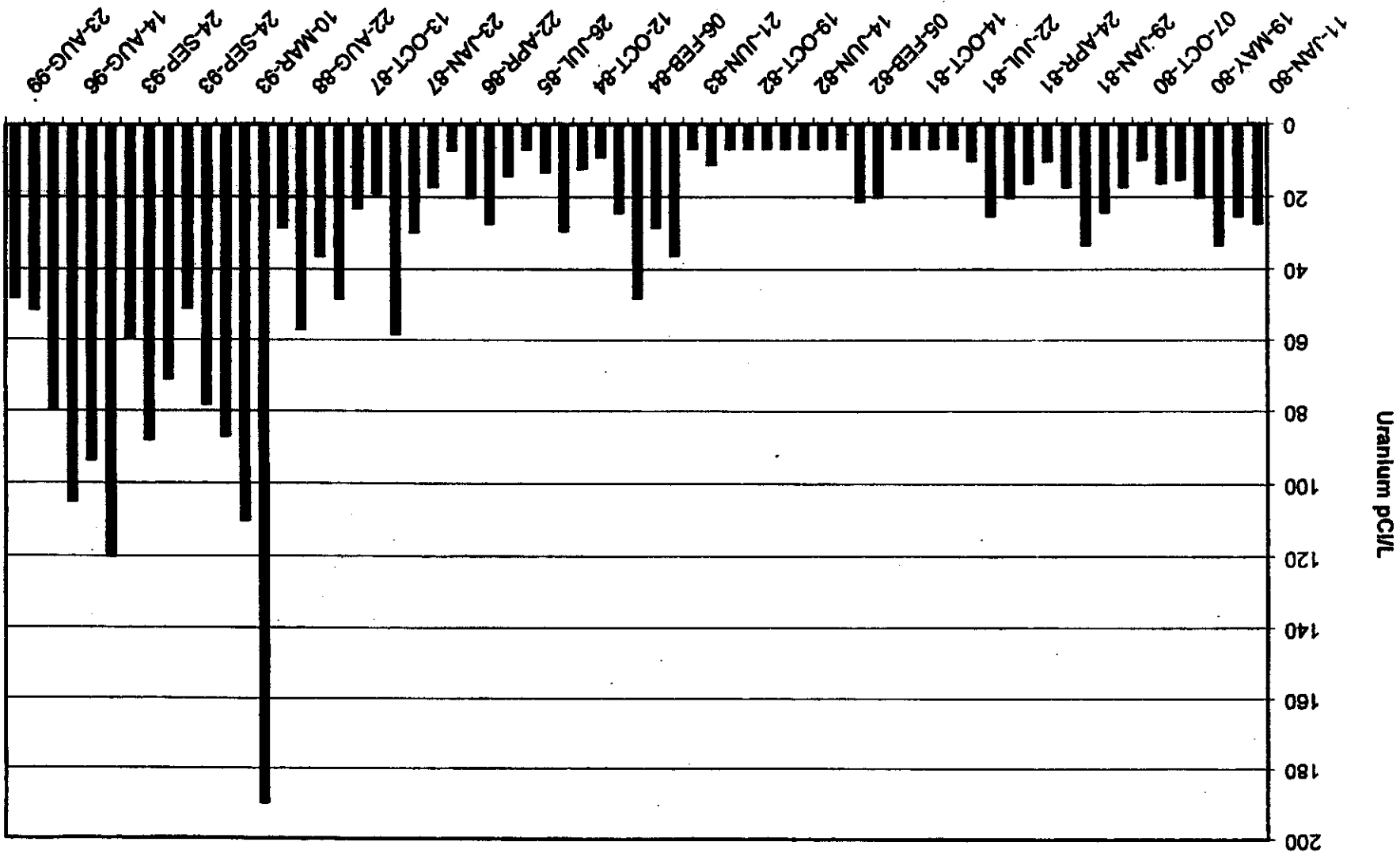
Well 399-1-2

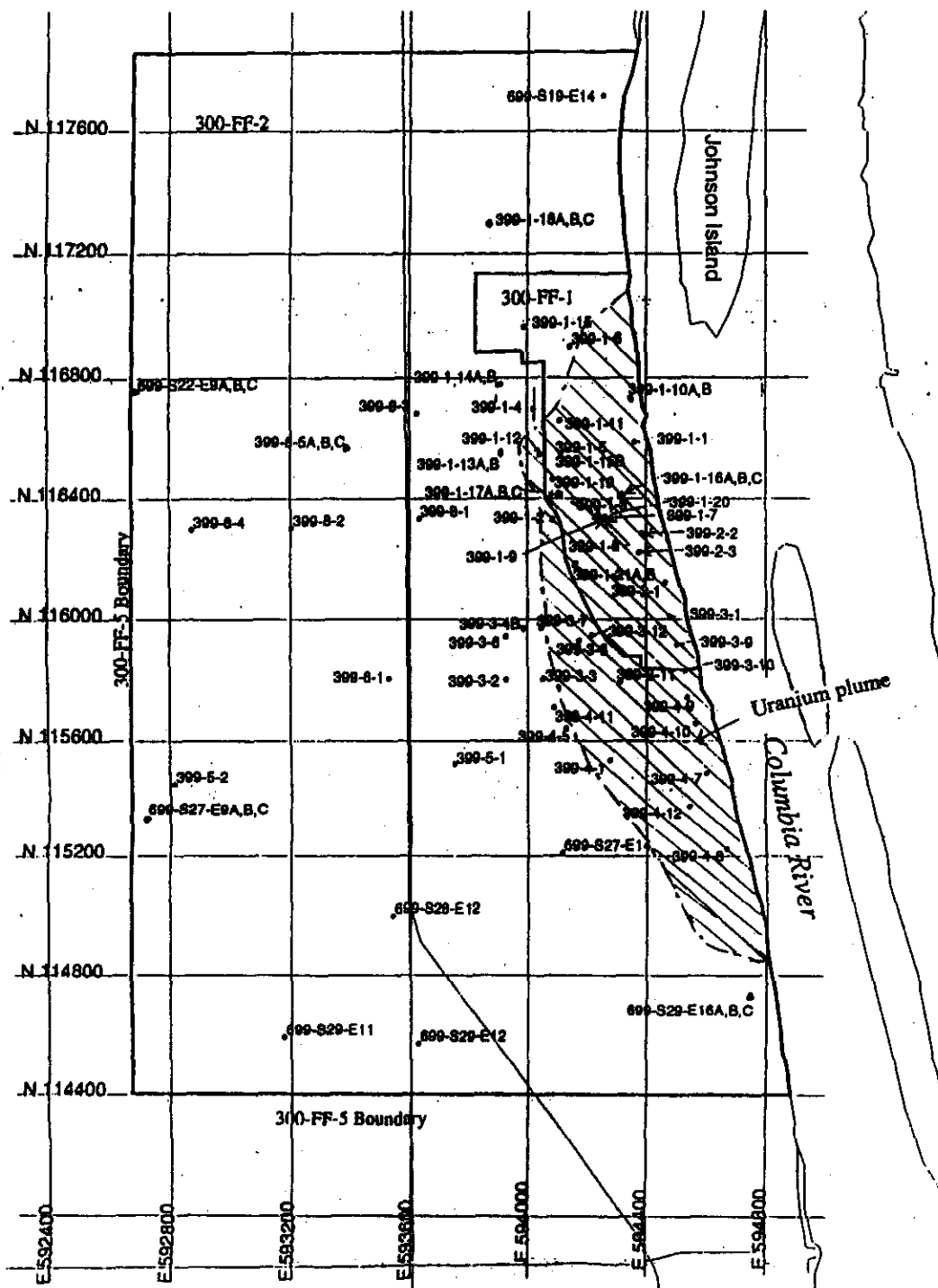


Well 399-1-4



Well 399-1-5





Note: Wells installed during the 300-FF-5 RI are identified in Table 2-1.  
 400-meter grid based on Lambert Coordinate System, NAD83.  
 Source: DOE-RL 1994a.

Figure 2-2. Location of Monitoring Wells in the 300-FF-5 Operable Unit.

DOE-RL-94-85  
 Rev. 0